C.A.C.I.

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: MDA903-76-C-0255D
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER: 9
4. TITLE (and Subtitle): Developmental Methodologies for Medium- to Long-Range Estimates: User's Manual for Long-Range Regional Forecasting Models
5. TYPE OF REPORT & PERIOD COVERED: Final Technical Report, Mar [redacted] - Sep [redacted] 76
6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Dr. John J. McIlroy, Dr. Leo Hazlewood
8. CONTRACT OR GRANT NUMBER(s): MDA903-76-C-0255
9. PERFORMING ORGANIZATION NAME AND ADDRESS: CACI, Inc. - Federal, 1815 North Fort Myer Drive, Arlington, Virginia 22209
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: ARPA Order [redacted] 3233, Program Code No. P6X10
11. CONTROLLING OFFICE NAME AND ADDRESS: Defense Advanced Research Project Agency, CTO, 1400 Wilson, Blvd., Arlington, Virginia 22209
12. REPORT DATE: Sep [redacted] 76
13. NUMBER OF PAGES: 49
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): 52 P.
15. SECURITY CLASS. (of this report): UNCLASSIFIED
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release-distribution unlimited

CACI-A0042P-2

DDC RECEIVED MAR 22 1977

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Forecasting, simulation, user-interaction, models, Europe, Middle East, Latin America, Africa, regime change, United States, Soviet Union, People's Republic of China.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes the use of four regional forecasting models (Europe, Middle East, Latin America, and Africa). The manual introduces the user to the overall research project and then describes the options available to the user for forecasting or simulations. Simple input and output are included.

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED 407 136

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

C.A.C.I.

WASHINGTON, D.C. OFFICES

FINAL TECHNICAL REPORT

DEVELOPMENTAL METHODOLOGIES FOR MEDIUM- TO LONG-RANGE ESTIMATES: USER'S MANUAL FOR LONG-RANGE REGIONAL FORECASTING MODELS (U)

September 1976

Sponsored by:

Defense Advanced Research Projects Agency

ARPA Order Number	3233
Program Code Number	P6W10
Contractor	CACI, Inc. -Federal
Effective Date of Contract	March 1, 1976
Expiration Date of Contract	September 30, 1976
Amount of Contract	$135,337
Contract Number	MDA903-76-C-0255
Principal Investigator	Dr. John J. McIlroy (703) 841-7800

PREFACE

This document is one of a series of reports describing the research activities undertaken to complete Defense Advanced Research Projects Agency (ARPA) supported contract number MDA903-76-C-0255, entitled "Developmental Methodologies for Medium- to Long-Range Estimates." These reports describe the project's empirical, methodological, substantive, technical, and theoretical contributions.

The Final Technical Report is presented as a set of documents rather than a single report. They are

- Executive Summary,
- Long-Range Regional Forecasting Models,
- The Soviet Force Effectiveness Model,
- User's Manual for the Long-Range Regional Forecasting Models,
- User's Manual for the Soviet Force Effectiveness Model, and
- Program Documentation for the Soviet Force Effectiveness Model.

The first three volumes substantively describe all research tasks, provide the rationale for research decisions, and report important findings. The remaining four volumes document the two computer programs delivered to the Defense Intelligence Agency/Directorate for Estimates (DIA/DE) for installation on the Defense Intelligence Agency On-Line System (DIAOLS).

The Executive Summary briefly describes the overall project. The volumes on the regional forecasting model and the force effectiveness model, by far the most substantive and complex of the documents, discuss the design and development of each of these models, respectively. The first reviews the regional models, identifies areas where improvements were made for DIA/DE, and presents the findings from sensitivity tests and computer simulations for Europe, the Middle East, Latin America, and Africa. The second fully discusses the development of the Soviet force effectiveness model. The volume is classified.

The remaining four volumes focus on the two computer models delivered to DIA/DE. A user's manual and program documentation have been written that provide all necessary information for using and maintaining the models.

ACKNOWLEDGEMENTS

This report was prepared by:

John J. McIlroy, Ph. D., Project Director
Leo Hazlewood, Ph. D.
Janice Fain, Ph. D.

The study team gratefully acknowledges the assistance and guidance received during the project from Captain Robert R. Hamer, USN, Mr. Joseph P. Longo, Captains Ronald F. Weiss and Randolph R. Brasch, USAF, of the Defense Intelligence Agency/Directorate for Estimates, and Lt. Donald Gaudutis, USA, of the Defense Intelligence Agency/Research Support Operations. The valuable contributions of Major General (USA, Ret) John J. Hayes, Richard E. Hayes, Ph. D., and Margaret D. Hayes, Ph. D., are also thankfully acknowledged. Finally each of the authors extends thanks to Nancy Streeter for editing the volumes and to Sharon O'Rourke, Ethel Glascoe, and Kathy Harris for their many long hours at the typewriters.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

PROJECT OVERVIEW

This User's Manual describes one of two important analytical technologies developed for the Defense Intelligence Agency/Directorate for Estimates (DIA/DE) under Defense Advanced Research Projects Agency (ARPA) Contract No. MDA903-76-C-0255, designed to improve the capability to forecast important factors that define the international military environment and have implications for long-range intelligence estimates. Two user-interactive computer models were developed in this project. The first enhances existing Department of Defense forecasting capabilities (CACI, 1975b, 1974, 1973) by applying social science research methodologies to long-range forecasting of important economic, military, and political variables. The second major product is a model that enables DIA/DE to measure total Soviet force effectiveness for use in estimative intelligence. Together, these efforts constitute technological innovations that enhance the reliability, accuracy, relevance, timeliness, and, therefore, the credibility of long-range forecasting for defense intelligence estimates and planning. This manual describes the user-initiated procedures for the regional long-range forecasting models.

This project had four objectives:

1. Refine and equalize the existing long-range forecasting models for Europe, the Middle East, Latin America, and sub-Saharan Africa, previously developed under ARPA contracts for the Joint Chiefs of Staff (JCS/J-5).

2. Enrich the existing models by including the People's Republic of China as a major actor in the superpower simulation capability and adding the option to simulate the impact of political regime changes.

3. Develop a model to estimate future Soviet force effectiveness based on the Defense Intelligence Projections for Planning (DIPP) document, including the capacity of the Soviet Union to improve the quality and quantity of its major weapon systems and pose increased threats to U.S. interests.

4. Implement the enriched forecasting models and the Soviet force effectiveness model on the Defense Intelligence Agency On-Line System (DIAOLS) with a user-interactive capability to permit DIA analysts to forecast alternative futures by altering data, superpower behavior, or regime type, and/or forecasting parameters to simulate different courses of action.

ACCOMPLISHMENTS

All phases of the research were completed so that offices with established DIAOLS linkages can access either the CACI regional forecasting models or the Soviet force effectiveness model. As proposed,

- The regional forecasting models have been standardized at comparable complexity for Europe, the Middle East, Latin America, and sub-Saharan Africa, and China has been added to the superpower influence set;

- The capability to influence forecasts by simulating regime changes was added and the models were made user-interactive;

- Sensitivity tests and simulations have been performed with each of the models, and the three programs associated with the regional forecasting models (the preprocessor, forecasting program, and report generator) have been installed on DIAOLS;

- The Soviet force effectiveness model has been developed using information available in the DIPP on the number and characteristics of Soviet weapon systems;

- An equation was developed that selectively aggregates weapon characteristics, interfaces them with DIPP force level information, and generates estimates of Soviet force effectiveness;

- A program for the Soviet force effectiveness model that permits user-interaction with the weapons system data and alternative assumptions about the growth and structure of Soviet forces has been implemented on DIAOLS and is presently available.

The two computer models considerably enhance DIA/DE's forecasting capability, as intelligence estimators can now generate and analyze long-range alternative futures for Europe, the Middle East, Latin America, and Africa, or alternative estimates of Soviet force effectiveness. In each case, the analyst has available a computer technology that permits structures and assumptions of either model to be altered to reflect an insight about the phenomenon being studied. Furthermore, the intelligence estimator has guidelines on how to interface the long-range regional forecasts with estimates of total Soviet force effectiveness. As analysts become more familiar with both models, their sensitivities to the implications of the generated forecasts and estimates will increase. More questions will eventually be asked that will tax the limits of the models. Finally, as they gain currency throughout the intelligence community, demands for increased sophistication and refinement can be expected.

The models produced by this research integrate traditional academic approaches and complex quantitative methodologies to develop tools that can improve intelligence estimates. In addition, the research interfaced qualitative and quantitative techniques that are intermingled in any modeling effort. It also produced vastly improved, standardized, and user-interactive versions of CACI's regional forecasting models.

Moreover, it produced the first generation of a user-interactive Soviet force effectiveness model that relies on highly sophisticated intelligence data. The lessons learned in completing these two major efforts should be intensely scrutinized by potential users.

CACI's past efforts in developing the regional forecasting models have involved collecting and organizing statistical information, applying statistical analytical techniques, examining the implications of data error, designing and constructing forecasting models, designing and developing user-interactive programs, applying regional versus country-specific forecasting equations, and so on. Each effort has clearly improved the reliability and validity of the regional forecasting models, thus advancing considerably the credibility of forecasts.

Even with these advances, continuing technology assessments suggest a number of unmet, yet very necessary, steps which must be taken to ensure that the best possible regional models are developed for the national security community. Some of these are

- Develop worldwide medium- to long-range estimative intelligence technologies. Currently, no model exists for Asia. Limited effort would be required to expand the current system to include that region. Further, the current structure contains the United States, the Soviet Union, and the People's Republic of China as influential superpowers. This set could, and should, be expanded to include Japan and the major Western European countries.

- Develop stochastic mechanisms for superpower interaction simulation. While including additional superpower influences is a substantial step toward improving the realism of a worldwide model, only the independent

effects of the superpowers will have been modeled. The action-reaction nature of superpower behaviors and the impacts of such activity on other nations can now only be indirectly simulated. These aspects can and should be modeled in greater detail.

- Explore and apply methodologies to enrich regional forecasts. Constraining the analyst's perspective to define sets of countries geographically has, to some extent, made modeling more difficult. One solution is to estimate country-specific parameters, an approach that has worked extremely well with the economic sector of the current model. However, when data are insufficient or inadequate, the relationships among environmental variables should be modeled for similar types of countries. These procedures should produce increasingly accurate forecasts.

The lessons learned from modeling Soviet force effectiveness should also be intensely evaluated. As expected, the data in the DIPP are more readily available for larger weapons. Consequently, a force effectiveness model favoring the available data was developed. Thus, the effectiveness of general purpose forces (naval. tactical air, and ground) is less well assessed by the current model. During the project, CACI continually clarified DIA/DE's specific interests on Soviet force effectiveness. For example, the distribution of off-line and on-line systems became important, as did the distinction between nuclear and non-nuclear weapons. Furthermore, distinctions as to the role of specific weapons (either offensive or defensive) sometimes became important in considering weapon effectiveness.

The current Soviet force effectiveness model discriminates between nuclear and non-nuclear weapons and off-line and on-line systems. It is also capable of aggregating different weapon systems to simulate specific missions. Other advances can readily be made.

- Identify forces by geographical region, permitting combinations of offensive and defensive capabilities in specific locations such as Europe, South Asia, and China.

- Evaluate Soviet force effectiveness of weapons in both an offensive and defensive role. This would considerably enhance the intelligence estimator's knowledge of the dimensions of force effectiveness and the overall effectiveness of specific forces analyzed in the DIPP.

- Develop measures of U.S. force effectiveness for offensive and defensive systems, located in selected geographical areas, to compare with Soviet force effectiveness measures. Such an analysis could eventually develop new technologies for quantitative net assessment.

Technology assessment is an ongoing process in which model builders and model users review and try to improve the range and quality of existing products. CACI's long-range forecasting models have been subjected to precisely this kind of scrutiny. This discussion identified new areas where further improvements should be made. The same is true of the Soviet force effectiveness model. As more users become acquainted with it, technology assessment will begin. The resulting feedback will contribute to the growth that must continue if forecasting and estimation capabilities within the Department of Defense are to become part of the policy-planning process in the national security community.

USING THE REGIONAL FORECASTING MODELS

This manual guides the user through a typical computer run of the models to illustrate options, pitfalls, and limitations that can be encountered. It is organized to give the user a general impression of the logic underpinning the structure of the forecasting programs. Details on the use of the models are provided. Finally, a sample run of the forecasting program is presented.

GENERAL STRUCTURE

The long-range regional forecasting model is composed of three programs.

1. A preprocessor (PRE) that leads the user through the other programs and stores changes in selected country characteristics and parameters of the model's equations,
2. A forecaster (FORE) that accepts user specifications for countries that are to be examined and reports that are to be printed,[1] and
3. A postprocessor (POST) that writes the requested output reports.

Information is passed from one program to the next until a computer run is completed and the user signs off at the terminal. Users interact with

[1] The FORE program can actually be considered a subset of four programs. The region-specific forecasting equations are determined by the forecasting parameters that become associated with FORE when a region is selected. Thus, the equation structure changes when a region changes. This results in a change in the structure of FORE.

only two programs in the system, the preprocessor (to specify changes) and the forecasting program (to specify output). The generalized structure of these three programs is presented in Figure 1 where signing on, selecting the region to be researched, making data or parameter changes with the preprocessor, and processing the changes with the forecasting program are shown. The figure also shows the complete forecasting and printing process.

SIGNING ON

The first step in using the long-range forecasting models is for the user to sign-on (log on) to a terminal that accesses the Defense Intelligence Agency On-Line System (DIAOLS). The procedures for signing, or logging, onto DIAOLS are classified. Once properly signed on, the user is queried by the terminal

SYSTEM?

The user responds[2]

FORTRAN

The computer responds

OLD OR NEW-

[2] DIAOLS teletype terminals permit entries in capital or lowercase letters. Enter commands in capital letters.

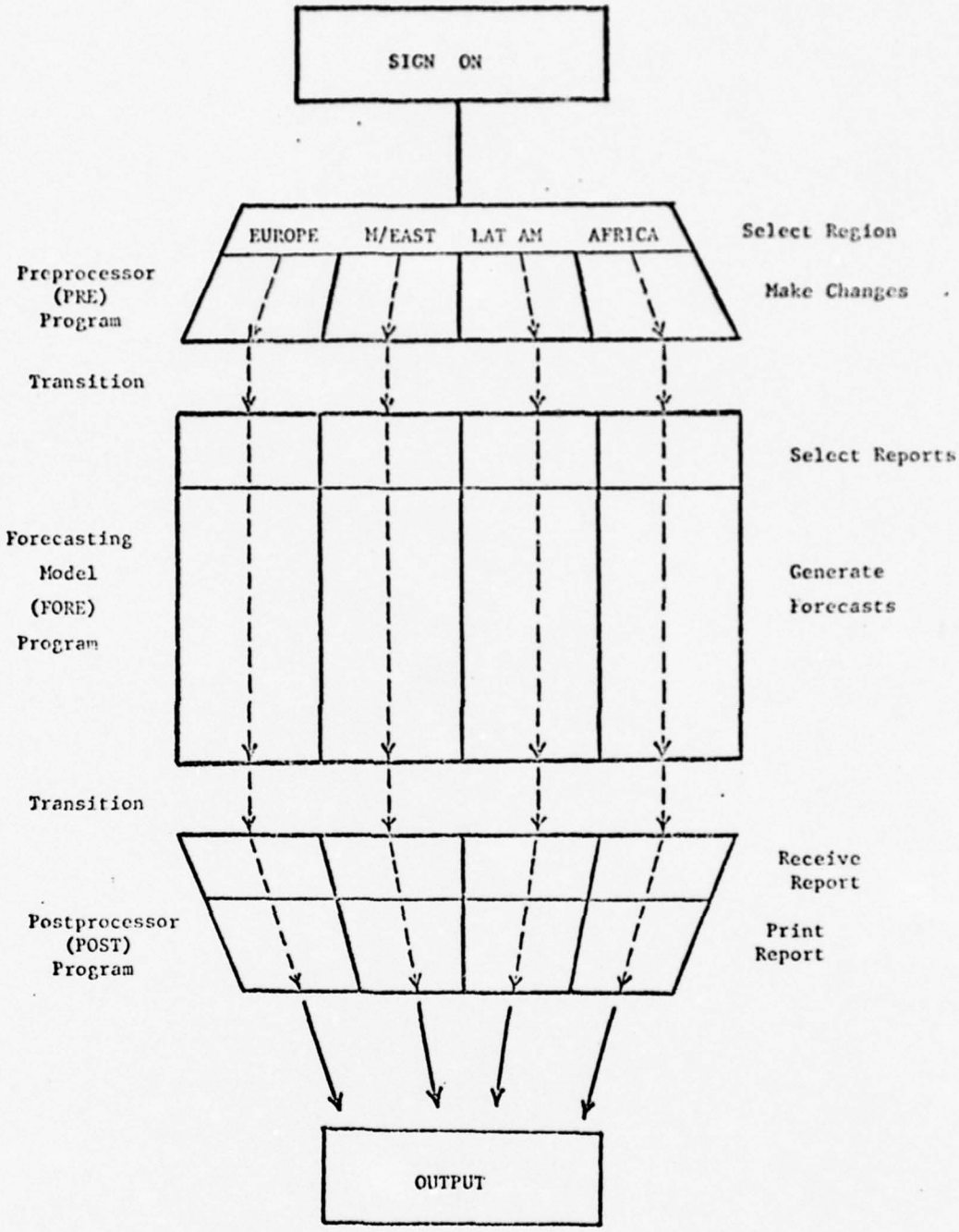

Figure 1. General Forecasting Program Structure

The user then types on the same line

OLD PRE

This copies the program (PRE) into the user's working space. Once this command is received, the terminal returns to the left margin. The user then (and only then) enters

RUN

Once the RUN command is entered, the user has entered the preprocessor program.

PREPROCESSOR (PRE)

The computer program is designed to be self-prompting. Occasionally the user may find the prompting inadequate. If this happens, the user should enter the command HELP to receive assistance. The program will then instruct the user about what actions and entries are permissible. By entering HELP, this user can always progress to the next step in the program.

The preprocessor first prompts the user about the world region (Europe, the Middle East, Latin America, or Africa) that is to be examined. It asks the user to

ENTER REGION CODE

The user can select one and only one region in a single computer run. The allowable entries are EURO (for the European region), MEST (for

the Middle East), LATA (for Latin America), or AFRI (for sub-Saharan Africa). Hence, the user enters one of the commands, for example,

MEST

If the user is unfamiliar with the available options, the HELP command can be entered. If HELP is entered, the program responds

ALLOWABLE ENTRIES ARE EURU, MEST,
LATA, AFRI.

and

ENTER REGION CODE

With this response, the user is led through a self-prompting, user-interactive, multilevel program. These levels cannot be skipped. To descend to the third level, for example, the user must pass through the first and second levels. To ascend from the third to the first, it is necessary to pass through the second.

To operate the preprocessor successfully, the user need only remember three general principles:

1. Any request for information may be answered by entering HELP. The program will respond with additional information.

2. When the question posed by the program logically requires a YES or NO answer, any entry except 'NO' will be treated as a YES.

3. The user can leave any program level by entering NO, NONE, or END.

Changing Data[3]

Once the user enters a region designation, the data file for that region is located and the region name is printed back. Then the computer program asks

FILE OK?

The user may respond either YES, NO, or OK.[4]

YES

If the user wants to initiate changes in the data files (that is, does not want to use existing data), a response of NO is entered.

NO

The program then prompts

TO CHANGE COUNTRY DATA, ENTER COUNTRY CODE

The user can change only those national attributes listed in Table 1 or the superpower behaviors listed in Table 2. To make any such change, the code for the specific country (shown in Appendix A) is entered first.

---

[3] Before exercising the simulation capability available with this program package, "standard forecasts" for the countries in which the user is interested should be generated. These forecasts will become the benchmarks against which all simulation exercises can be composed.

[4] YES and OK are always interchangeable.

TABLE 1

National Attributes That May Be Changed

Attribute Code	Definition
CNF	International Conflict Acts
CNS	Domestic Consumption
COU[a]	Coups d'Etat
DEX	Defense Expenditure
GDP	Gross Domestic Product
GOV	Government Type
INV	Gross Fixed Capital Formation
KAD	Rival
TEX	Exports
TIM	Imports
TML	Domestic Turmoil

[a] In the case of Europe this variable is coded as revolt data. *See CACI* (1974: 141-208).

TABLE 2

Superpower Behaviors That May Be Changed

Behavior Code[a]	Definition
CHA	China Economic Aid
CHC	China Cooperative Acts
CHM	China Military Aid
CHT	China Arms Transfers
SOA	Soviet Economic Aid
SOC	Soviet Cooperative Acts
SOM	Soviet Military Aid
SOT	Soviet Arms Transfers[b]
USA	U.S. Economic Aid
USC	U.S. Cooperative Acts
USM	U.S. Military Aid
UST	U.S. Arms Transfers[b]

[a] These abbreviations are used when entering changes through the preprocessor.

[b] For Europe, this variable is arms trade rather than transfers. See CACI (1976i: Appendix B) for detailed definitions.

For example, if data for Chile are to be changed, the user must enter

CHI

The program then prompts

ENTER ATTRIBUTE NAME

The name of the variable to be changed is entered next using the codes in either Table 1 or Table 2. If defense expenditures are to be modified, the user enters

DEX

The program responds with the current value (for 1970) and establishes a range for the new value.

CURRENT VALUE IS 145.00

The user then enters the different value

100.00

The program then asks for the year in which change data are to be used.

ENTER YEAR OF CHANGE

The user responds with a four-digit year, such as

1971

The process is repeated until the user has entered all desired country attribute changes. Hence, when the program prompts again

ENTER ATTRIBUTE NAME

the user responds

NO

to end the changes for a specific country. In case the user wants to continue with another country, the program asks

TO CHANGE COUNTRY DATA, ENTER COUNTRY CODE

If data for a second country are to be changed, another country code must be entered. If no further changes are to be entered, the user responds

END

When the user has entered all desired changes, the program asks

DO YOU WANT TO LOOK AT CHANGES?

If YES is entered, all changes will be printed.[5] If NO is entered, the terminal prompts

FILE OK?

If the user answers YES to this question, the computer accepts and saves all changes to pass on to the forecast calculation program (FORE). However, if the user responds NO, all entered changes are wiped out. Thus, if the user has made extensive changes, but accidentally left something out, YES might be entered even if the simulation will be less than perfect. The simulation will never be a total loss, but the user's time at the terminal will have been wasted.

Table 3 reviews the sequence required to change data on a specific country. The responses that the user must enter are underlined.

Changing Parameters

At times the user may want to change the values derived to weight individual variables in the forecasting model equations.[6] To make these changes, a process similar to the one shown for changing data is followed. Table 4 presents the codes for different parameters that are to be used for these changes.

---

[5] The user should review the changes, especially if they are elaborate. If the analyst has made a conscious effort to develop a detailed study, a record of all changes should be kept. These records will eventually form an audit trail.

[6] Details on how these parameters were derived are presented in CACI (1976i, 1976j).

TABLE 3

First Example of User-Specifications of a
Country Attribute Change in the Preprocessor

Terminal Input/Output

```
? LATA
     LATIN AMERICA
     FILE OK
? OK
                21                    2                   20
     TO CHANGE COUNTRY DATA, ENTER COUNTRY CODE
? CHI
     ENTER ATTRIBUTE NAME
? DEX
CURRENT VALUE IS       145.0000
ENTER NEW VALUE
? 100
ENTER YEAR OF CHANGE
? 1971
     ENTER ATTRIBUTE NAME
? NO
     TO CHANGE COUNTRY DATA, ENTER COUNTRY CODE
? NO
     TO CHANGE PARAMETERS ,  ENTER DEPENDENT VARIABLE NAME
? NO
     DO YOU WANT TO LOOK AT CHANGES
? YES

 YEAR CNTY ATT          OLD          NEW
 1971 CHI  DEX        145.00       100.00

 YEAR DEP V  P  CNTY          OLD          NEW
     NONE
     FILE OK
? OK
STOP.
```

TABLE 4

Dependent Variables Whose Parameters May Be Changed

Equations With Country-Specific Parameters

Variable Name	Parameters	Variable Definition
POP	B01	Population
CNS	B02	Consumption
INV	B03	Gross Fixed Capital Formation
TIM	B04	Imports
TEX	B05	Exports

Equations With Region-Specific Parameters

Variable Name	Parameters	Variable Definition
TUS	A17-A21	Trade With U.S.
TSU	A22-A26	Trade With U.S.S.R.
TCH	A27-A31	Trade With PRC
MLM	A08-A16, A36, A72	Military Manpower
CNF	A53-A58	International Conflict
DEX	A01-A07	Defense Spending
VUS	A38-A42	U.N. Voting Agreement With U.S.
VSU	A43-A47	U.N. Voting Agreement With U.S.S.R.
VCH	A48-A51	U.N. Voting Agreement With PRC
TML	A63-A66	Turmoil
RVL	A64-A69	Revolt (Europe Only)
COU	A64-A69	Coup d'Etat (LDCs Only)

Superpower Equation Parameters

Variable Name	Parameters	Variable Definition
USG	C01	U.S. Gross National Product
SUG	C02	U.S.S.R. Gross National Product
CHG	C03	PRC Gross National Product

Once the user has completed all desired data changes, the program prompts

> TO CHANGE PARAMETERS, ENTER DEPENDENT VARIABLE NAME

The user enters the dependent variable (the behavior that is to be explained by the equation) using the code on Table 5. For example, the user might enter

> POP

to change one of the U.N. voting variables. Once the dependent variable has been entered, the program prints out the existing version of the equation used in the model. This equation is in a standard form[7] where the letter and number combination (such as A33) designate the parameter in question in the equation. For example, the equation for POP is

> POP(T)=B01*POP(T-1)

The program asks for the parameter that is to be changed. In this case, the user enters the numeric part of the alphanumeric designator of the

---

[7] All forecast equations follow the general form

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n$$

where: Y = the forecast variable (Table 4)
X = the independent variables (Table 2)
β = forecast parameters (Table 4)

TABLE 5

Variables Printed in the Output Reports

Economic Report

Year

Investment (INV)

Consumption (CNS)

Total Exports (TEX)

Total Imports (TIM)

Gross Domestic Product (GDP) and Percent Change (PCC)[a]

GDP Per Capita (GPOP) and Percent Change

Military Report

Year

Defense Expenditure (DEX) and Percent Change

Defense Expenditures as a Fraction of GDP (DEX/GDP) Percent Change

Military Manpower Defense Expenditures as a Fraction of Population and Percent Change

Defense Expenditures Per Capita and Percent Change

Alignment Report

Year

Trade With the Superpowers as a Fraction of Total Trade and Percent Change

Trade Alignment With U.S., Soviet Union, and China

Voting Intensity and Percent Change

Voting Alignment With U.S., Soviet Union, and China

Total Alignments With U.S., Soviet Union, and China

Conflict Report

Year

Arms Alignment With U.S., Soviet Union, and China

Turmoil and Percent Change

Conflict and Percent Change

Coup Index (Revolt, for Europe) and Percent Change

Tension Ratio and Percent Change

---

[a] Percent change is the difference between the current year and the previous year divided by the previous year.

parameter. Thus, instead of B01, the user simply enters

01

to change the parameter associated with the variable POP.

Once the parameter to be changed has been designated, the user is given the current value and the range of the new value.

CURRENT VALUE IS 1.023000

ENTER NEW VALUE BETWEEN .920700 AND 1.125301

The user then enters the new value that is to be used in the forecasting equations

1.0

and is asked when the new parameter is to take effect

ENTER YEAR OF CHANGE

The user responds with a complete (four-digit) year designation

1971

and is given an opportunity to change additional parameters in the same equation.

ENTER NUMBER OF PARAMETER TO BE CHANGED

If another parameter in the same equation is to be changed, the process is repeated. If the user is finished with that equation, a NO is entered.

NO

The program then asks whether parameters are to be changed in another equation by telling the user to

ENTER DEPENDENT VARIABLE NAME

If another equation is to be modified, the user simply repeats the sequence of answers outlined to this point. However, if the user has completed parameter changes, another NO is entered

NO

The program then gives the user a chance to review the changed parameters by asking

DO YOU WANT TO LOOK AT CHANGES

If the user says NO, the sequence is completed. If the user enters YES or OK, the changed parameters and the old parameters are printed and the user is again asked whether the file contents are acceptable. If the user enters OK or YES, the process stops. If the user says NO, a chance to correct is given by going through the entire sequence again. Hence, as Table 6 (which reviews several parameter changes) shows, the sequence is as follows:

DO YOU WANT TO LOOK AT CHANGES

YES

TABLE 6

Second Example of User-Specification
of Parameter Change in the Preprocessor

Terminal Input/Output

```
     ENTER REGION CODE.
? LATA
     LATIN AMERICA
     FILE OK
? YES
                21                    2                   20
     TO CHANGE COUNTRY DATA, ENTER COUNTRY CODE
? NO
     TO CHANGE PARAMETERS , ENTER DEPENDENT VARIABLE NAME
? POP
POP(T)=B01*POP(T-1)

      ENTER NUMBER OF PARAMETER TO BE CHANGED
? 01
     PARAMETERS IN THIS EQUATION ARE COUNTRY SPECIFIC
     ENTER COUNTRY CODE
? CHI
CURRENT VALUE IS            1.023000
ENTER NEW VALUE BETWEEN              .920700 AND            1.125301
? 1.
ENTER YEAR OF CHANGE
? 1971
     ENTER COUNTRY CODE
? NO
     ENTER NUMBER OF PARAMETER TO BE CHANGED
? NO
```

Continued

Table 6
Second Example
Continued

```
     ENTER DEPENDENT VARIABLE NAME
? VUS
VUS(T)=*AU* +A39*S2+A40*TCH(T)+A41*S3+A42*S5

     ENTER NUMBER OF PARAMETER TO BE CHANGED
? 40
CURRENT VALUE IS          15.780000
ENTER NEW VALUE BETWEEN          14.202000 AND          17.358001
? 14000.
VALUE OUTSIDE ALLOWED LIMITS
CURRENT VALUE IS          15.780000
ENTER NEW VALUE BETWEEN          14.202000 AND          17.358001
? 0
ENTER YEAR OF CHANGE
? 1971
     ENTER NUMBER OF PARAMETER TO BE CHANGED
? NO
     ENTER DEPENDENT VARIABLE NAME
? NO
     DO YOU WANT TO LOOK AT CHANGES
? YES

 YEAR CNTY ATT        OLD         NEW
     NONE

 YEAR DEP V  P  CNTY         OLD         NEW
 1971 POP    1   CHI           1.02          1.00
 1971 VUS   40   ALL          15.78          0.
     FILE OK
? OK
STOP.
```

Then the changes are printed out and the user is asked

FILE OK

YES

If the file is acceptable, the sequence ends with

STOP

At the end of this sequence, the original data file would be passed from PRE to the forecasting program. The user must then call the forecasting program and pass changes to it by typing

OLD, FORE

FORECASTING PROGRAM (FORE)

The forecasting program computes the model's dependent variables for a 20-year period and records the printed output requested by the user. The output from the model is divided into four reports: economic, military, political alignment, and conflict. Table 5 shows the contents of these reports. For efficiency, certain computations are bypassed if the user does not want to obtain the reports in which they are printed. Moreover, only output for countries in the region selected by the user are saved for printing.

The program displays each report title and the user enters YES (or OK) or NO to indicate that the report is or is not to be printed. Thus, if the user wants all reports, a YES or OK is entered after each question.

WANT ECONOMIC REPORT?

YES

WANT MILITARY REPORT?

YES

WANT ALIGNMENT REPORT?

YES

WANT CONFLICT REPORT?

YES

Once the reports that are to be printed have been identified, the program asks the user to select the countries for which reports are desired. Up to 15 countries can be selected and printed in a single run. Since there are 25 countries in the European region, 21 in Latin America, 15 in the Middle East, and 29 in Africa, some segmentation of three of the four regions is required. In other words, all of the countries in the Middle East can be reported on in a single forecasting run, but two passes are required to do each of the other three regions.[8]

Thus, after the reports to be printed have been identified, the program prompts

ENTER COMMAND FOR COUNTRY CODES

[8] All countries in a region are carried through the preprocessor. Unless the user wishes to enter a new set of changes, the process need not be repeated to obtain reports for all of the countries.

The user must specify which set of countries within the region is desired. There are three choices.[9]

1. FIRST or F to indicate countries 1-15.
2. SECOND or S to indicate countries 16 through the end of the data file.
3. INC for Individual Country codes. Any other character, such as I (but excluding H, F, or S) can also be used.

If the user wants the first 15 countries, a response of

F

is given. However, if the user wants to see forecasts reported for one or more specific countries, the sequence will be

ENTER COMMAND FOR COUNTRY CODES

I

At this point, the program asks for the number of individual countries.

HOW MANY COUNTRIES?

[9] The ordering of the countries in the data file is the same as in Appendix A.

The user must then enter a two-digit integer (less than or equal to 15) for the number of countries to be included in the report.[10] For example, if three countries are to be reported on, the user enters

03

After the number of countries to be included in the reports has been specified by the user, the program asks for the name of the specific countries involved. These abbreviations are presented in Appendix A of this manual.[11] For example, if the user wants reports on Iran, Israel, and Saudi Arabia, three abbreviations are entered. These are separated only by spaces, not commas.

IRN ISR SAU

Once the countries have been designated, the program reprints the results of the question-and-answer sequence.

THE FOLLOWING REPORTS MAY BE PRINTED:

ECONOMIC REPORT

MILITARY REPORT

ALIGNMENT REPORT

CONFLICT REPORT

---

[10] If the user enters a number greater than 15, an alphabetic character (such as AB), or an alphanumeric combination (such as A6), an error message will be printed and another attempt must be made. Program execution will be automatically terminated and the user must start over.

[11] To see a list of the countries in a specific region, the user can respond with HEL (an abbreviated form of HELP).

FOR THE FOLLOWING COUNTRIES:

IRN

ISR

SAU

Table 7 displays the entire question-and-answer sequence for the forecasting program.[12] After the forecasting program has completed all of the computations and reports desired and indicates that it is ready to print the results, the user enters

OLD POST

a command that initiates the postprocessor program.

POSTPROCESSOR (POST)

The postprocessor is not an interactive program. It is strictly a report writing program that prints according to the format shown in Table 8. The printing will continue until all country reports have been printed for the forecasts selected by the user.

[12] The user can enter STOP to terminate execution at this point. The program will then abort.

TABLE 7

Sample FORE Exercise

```
 RUN
 WANT ECONOMIC REPORT  ?
 ? OK
 WANT MILITARY REPORT  ?
 ? OK
 WANT ALIGNMENT REPORT ?
 ? OK
 WANT CONFLICT REPORT  ?
 ? OK
 ENTER COMMAND FOR COUNTRY CODES
 ? I
 HOW MANY COUNTRIES ?
 ? 02
 ENTER  2 COUNTRY CODES
 ? IRN SAU
 THE FOLLOWING REPORTS MAY BE PRINTED:
ECONOMIC REPORT
MILITARY REPORT
ALIGNMENT REPORT
CONFLICT REPORT
 FOR THE FOLLOWING COUNTRIES:
IRN
SAU
 STOP.
```

TABLE 8

Sample Report Output for Venezuela

MILITARY REPORT FOR VEN 1970 POPULATION 10300.0

YEAR	DEX	PCC	DEX/GDP	PCC	DEX/POP	PCC	MLM	PCC	DEX/MLM	PCC
1970	204.0	0	.02	0	.02	0	50.00	0	4080.00	0
1971	204.3	0	.02	-4	.02	-3	110.76	122	1844.40	-55
1972	199.9	-2	.02	-5	.02	-5	110.39	0	1802.34	-2
1973	197.0	-1	.02	-5	.02	-5	108.94	-2	1808.54	0
1974	195.5	-1	.02	-5	.02	-4	107.69	-1	1816.09	0
1975	195.5	-0	.02	-4	.02	-4	107.05	-1	1826.45	1
1976	196.8	1	.02	-4	.02	-3	107.03	-0	1838.97	1
1977	197.9	1	.02	-4	.01	-3	107.60	1	1838.71	-0
1978	199.6	1	.01	-3	.01	-3	108.06	0	1846.99	0
1979	200.8	1	.01	-4	.01	-3	108.81	1	1845.16	-0
1980	202.2	1	.01	-4	.01	-3	109.34	0	1849.53	0
1981	203.8	1	.01	-4	.01	-3	109.98	1	1852.57	0
1982	205.1	1	.01	-4	.01	-3	110.65	1	1853.68	0
1983	206.4	1	.01	-4	.01	-3	111.25	1	1854.99	0
1984	208.5	1	.01	-3	.01	-3	111.80	0	1864.78	1
1985	210.7	1	.01	-3	.01	-3	112.73	1	1868.69	0
1986	212.9	1	.01	-3	.01	-3	113.59	1	1872.47	0
1987	215.2	1	.01	-3	.01	-3	114.57	1	1878.35	0
1988	217.5	1	.01	-3	.01	-2	115.57	1	1880.73	0
1989	220.1	1	.01	-3	.01	-2	116.72	1	1885.67	0
1990	222.7	1	.01	-3	.01	-2	117.84	1	1889.65	0

Continued

Table 8
Sample Report
Continued

ALIGNMENT REPORT FOR VEN 1970 POPULATION 10300.0

YEAR	TRD	POC	TUS	TSU	TCH	VTR	POC	VUS	VSU	VCH	ALUS	ALSU	ALC
1970	0.	0	0	0	0	46.3	0	49	38	27	49	38	27
1971	.141	8	85	13	1	34.7	-25	45	31	25	131	44	25
1972	.144	2	85	12	1	34.7	-0	45	31	25	131	43	25
1973	.147	2	85	12	1	34.7	-0	45	31	25	131	43	25
1974	.150	2	85	12	1	34.7	-0	45	31	25	131	43	25
1975	.153	2	85	12	1	34.7	-0	45	31	25	131	43	25
1976	.156	2	86	12	1	34.7	-0	45	31	25	132	43	25
1977	.159	2	86	12	1	34.7	-0	45	31	25	132	43	25
1978	.162	2	86	12	1	34.6	-0	45	31	25	132	43	25
1979	.023	-86	0	91	8	41.0	18	47	44	30	47	135	38
1980	.023	1	0	91	8	41.0	-0	47	44	30	47	135	38
1981	.023	1	0	92	7	41.0	-0	47	44	30	47	136	37
1982	.023	1	0	92	7	41.0	-0	47	44	30	47	136	37
1983	.024	1	0	92	7	40.9	-0	47	44	30	47	136	37
1984	.024	1	0	93	6	40.9	-0	47	44	30	47	137	36
1985	.024	1	0	93	6	40.9	-0	47	44	30	47	137	36
1986	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1987	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1988	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1989	.026	1	0	94	5	40.9	-0	47	44	30	47	138	35
1990	.026	1	0	94	5	40.3	-0	47	44	30	47	138	35

Continued

Table 8
Sample Report
Continued

```
>MM,M=9000

                    MILITARY REPORT  FOR VEN  1970 POPULATION  10300.0
YEAR      DEX    PCC   DEX/GDP  PCC   DEX/POP  PCC     MLM     PCC   DEX/MLM  PCC
1970      204.0    0       .02    0       .02    0     50.00     0   4080.00    0
1971      204.3    0       .02   -4       .02   -3    110.75   122   1844.40  -55
1972      199.9   -2       .02   -5       .02   -5    110.89     0   1802.84   -2
1973      197.0   -1       .02   -5       .02   -5    108.94    -2   1809.54    0
1974      195.6   -1       .02   -5       .02   -4    107.59    -1   1816.09    0
1975      195.5   -0       .02   -4       .02   -4    107.05    -1   1826.45    1
1976      195.8    1       .02   -4       .02   -3    107.03    -0   1838.97    1
1977      197.9    1       .02   -4       .01   -3    107.60     1   1838.71   -0
1978      199.6    1       .01   -3       .01   -3    108.06     0   1846.99    0
1979      200.8    1       .01   -4       .01   -3    108.81     1   1845.16   -0
1980      202.2    1       .01   -4       .01   -3    109.34     0   1849.53    0
1981      203.8    1       .01   -4       .01   -3    109.98     1   1852.57    0
1982      205.1    1       .01   -4       .01   -3    110.55     1   1853.53    0
1983      206.4    1       .01   -4       .01   -3    111.25     1   1854.99    0
1984      208.5    1       .01   -3       .01   -3    111.80     0   1864.78    1
1985      210.7    1       .01   -3       .01   -3    112.73     1   1868.59    0
1986      212.9    1       .01   -3       .01   -3    113.59     1   1872.47    0
1987      215.2    1       .01   -3       .01   -3    114.57     1   1876.85    0
1988      217.5    1       .01   -3       .01   -2    115.57     1   1880.73    0
1989      220.1    1       .01   -3       .01   -2    116.72     1   1885.57    0
1990      222.7    1       .01   -3       .01   -2    117.84     1   1889.55    0
```

Continued

Table 8
Sample Report
Continued

ALIGNMENT REPORT FOR VEN 1970 POPULATION 10300.0

YEAR	TRD	POC	TUS	TSU	TCH	VTR	POC	VUS	VSU	VCH	ALUS	ALSU	ALC
1970	0.	0	0	0	0	46.3	0	49	38	27	49	38	27
1971	.141	9	85	13	1	34.7	-25	46	31	25	131	44	25
1972	.144	2	85	12	1	34.7	-0	46	31	25	131	43	25
1973	.147	2	85	12	1	34.7	-0	46	31	25	131	43	25
1974	.150	2	85	12	1	34.7	-0	46	31	25	131	43	25
1975	.153	2	85	12	1	34.7	-0	46	31	25	131	43	25
1976	.156	2	86	12	1	34.7	-0	46	31	25	132	43	25
1977	.159	2	86	12	1	34.7	-0	46	31	25	132	43	25
1978	.162	2	86	12	1	34.6	-0	46	31	25	132	43	25
1979	.023	-86	0	91	8	41.0	18	47	44	30	47	135	38
1980	.023	1	0	91	8	41.0	-0	47	44	30	47	135	38
1981	.023	1	0	92	7	41.0	-0	47	44	30	47	136	37
1982	.023	1	0	92	7	41.0	-0	47	44	30	47	136	37
1983	.024	1	0	92	7	40.9	-0	47	44	30	47	136	37
1984	.024	1	0	93	6	40.9	-0	47	44	30	47	137	36
1985	.024	1	0	93	6	40.9	-0	47	44	30	47	137	36
1986	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1987	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1988	.025	1	0	93	6	40.9	-0	47	44	30	47	137	36
1989	.026	1	0	94	5	40.9	-0	47	44	30	47	138	35
1990	.026	1	0	94	5	40.8	-0	47	44	30	47	138	35

REFERENCES

Agency for International Development (AID) (1974) U.S. Overseas Grants and Loans. Washington, D.C.: AID.

Arms Control and Disarmament Agency (ACDA) (1976) World Military Expenditures and Arms Trade, 1965-1974. Washington, D.C.: ACDA.

___ (1975) World Military Expenditures and Arms Transfers, 1965-1970. Washington, D.C.: ACDA.

BANKS, A.S. (1970) Cross-Polity Time Series Data. Cambridge, Mass.: MIT Press.

BINDER, D. (1976) "U.S. Aide Accuses Soviet on New Missile," The New York Times (September): 2.

BLALOCK, H. (1960) Social Statistics. New York: McGraw-Hill Book Co.

BRODBECK, M. (1968) Readings in the Philosophy of the Social Sciences. New York: The MacMillan Co.

CACI (1976a) Technical Memorandum No. 1: Equalizing Current Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976b) Technical Memorandum No. 2: Adding the People's Republic of China to the Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976c) Technical Memorandum No. 3: Developing a Soviet Total Force Effectiveness; Approaches and Methodology. Arlington, Va.: CACI, Inc.

___ (1976d) Technical Memorandum No. 4: Developing Linkages From Regime Change to National Attribute Variables. Arlington, Va.: CACI, Inc.

___ (1976e) Technical Memorandum No. 5: Structure of the Soviet Force Effectiveness Model (U). Arlington, Va.: CACI, Inc. (CONFIDENTIAL)

___ (1976f) Technical Memorandum No. 6: Sensitivity Evaluation of the Regional Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976g) Technical Memorandum No. 7: Sensitivity Evaluation of the Soviet Force Effectiveness Model (U). Arlington, Va.: CACI, Inc. (SECRET)

___ (1976h) Technical Memorandum No. 8: Developing a Methodology to Relate the Regional and Soviet Force Models. Arlington, Va.: CACI, Inc. (SECRET)

___ (1976i) Developmental Methodologies for Medium- to Long-Range Estimates: Interim Technical Report. Arlington, Va.: CACI, Inc.

___ (1976j) Developmental Methodologies for Medium- to Long-Range Estimates: Regional Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976k) Developmental Methodologies for Medium- to Long-Range Estimates: Soviet Force Effectiveness Model (U). Arlington, Va.: CACI, Inc. (SECRET/NFD)

___ (1976l) Developmental Methodologies for Medium- to Long-Range Estimates: User's Manual for the Regional Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976m) Developmental Methodologies for Medium- to Long-Range Estimates: System Documentation for the Regional Forecasting Models. Arlington, Va.: CACI, Inc.

___ (1976n) Developmental Methodologies for Medium- to Long-Range Estimates: User's Manual for the Soviet Force Effectiveness Models. Arlington, Va.: CACI, Inc.

___ (1976o) Developmental Methodologies for Medium- to Long-Range Estimates: System Documentation for the Soviet Force Effectiveness Model. Arlington, Va.: CACI, Inc.

___ (1975a) Stochastic Simulations of Long-Range Forecasting Models for Less Developed Regions, Interim Technical Report (June). Arlington, Va.: CACI, Inc.

___ (1975b) Stochastic Simulations of Long-Range Forecasting Models, Volumes I, II, III (October). Arlington, Va.: CACI, Inc.

___ (1974) Quantitative Methods for Long-Range Environmental Forecasting: Long-Range European Projections, Volume II (March). Arlington, Va.: CACI, Inc.

___ (1973) Quantitative Methods for Long-Range Environmental Forecasting: Interim Technical Report, Volume II (February). Arlington, Va.: CACI, Inc.

Defense Intelligence Agency (DIA) (1976a) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section II: Long-Range Aviation (March) (S-4036/DE-1). SECRET/NFD/RD

___ (1976b) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section III: Aerospace Defense Forces (March) (S-4037/DE-1). SECRET/NFD/WINTEL/RD

___ (1976c) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section IVA: General Purpose Ground Forces (March) (S-4035/DE-1). SECRET/NFD/WINTEL/RD

___ (1976d) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section I: Ballistics Missile Forces (June) (DE TSC 254-76). TS/NFD/RD

___ (1975a) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section I: Ballistics Missile Forces (April) (DE TSC 171-75). TS/NFD/RD

___ (1975b) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section IVE: Soviet Frontal Aviation (July) (S-4072/DE-1). S/NFD/RD

___ (1975c) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section IVC: General Purpose Naval Forces (August) (DE-TSC 401-75). TS/NFD/RD

___ (1974) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section IVD: Military Air Transport Forces (June) (DE-4100/DE-1). S/NFD

___ (1972) Defense Intelligence Projections for Planning (U). Soviet Military Forces, Section VII: Military Expenditures Implications (March) (S-4021/DE-1). S/NFD

___ (1969) Physical Vulnerability Handbook - Nuclear Weapons (U). (AP-550-1-2-INT). CONFIDENTIAL

DRAPER, N. and H. SMITH (1966) Applied Regression Analysis. New York: John Wiley and Sons, Inc.

DUPUY, Col. T.N. (1976) "The Quantified Judgment Method of Analysis of Historical Combat Data." Dunn Loring, Va.: Historical Evaluation and Research Organization.

FIRESTONE, J. and R. CHADWICK (1972) "A New Procedure for Constructing Measurement Models of Concepts." (mimeo)

HEMPEL, C.G. (1966) Philosophy of Natural Science. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

___ (1965) Aspects of Scientific Explanation. New York: The Free Press.

___ (1952) Fundamentals of Concept Formation in Empirical Science. Chicago: University of Chicago Press.

KAPLAN, A. (1964) The Conduct of Inquiry. San Francisco: Chandler Publishing Company.

OLSEN, M. and R. ZECKHAUSER (1966) "An Economic Theory of Alliances," Review of Economics and Statistics 48, 3 (August): 266-279.

RUDNER, R. (1966) Philosophy of Social Science. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

STOCKFISH, J.A. (1975) Models, Data, and War: A Critique of the Study of Conventional Forces. Santa Monica: Rand.

APPENDIX A

Countries and Abbreviations
by Region

Europe

Abbreviations	Country
AUS	Austria
BLU	Belgium-Luxembourg
BUL	Bulgaria
CZE	Czechoslovakia
DEN	Denmark
GDR	East Germany
FIN	Finland
FRN	France
GRC	Greece
HUN	Hungary
ICE	Iceland
IRE	Ireland
ITA	Italy
NTH	Netherlands
NOR	Norway
POL	Poland
POR	Portugal
ROM	Rumania
SPN	Spain
SWD	Sweden
SWZ	Switzerland
TUR	Turkey
UNK	United Kingdom
WGR	West Germany
YUG	Yugoslavia

Latin America

Abbreviations	Country
ARG	Argentina
BOL	Bolivia
BRA	Brazil
CHI	Chile
COL	Colombia
COS	Costa Rica
CUB	Cuba
DOM	Dominican Republic
ECU	Ecuador
ELS	El Salvador
GUA	Guatemala
HAI	Haiti
HON	Honduras
JAM	Jamaica
MEX	Mexico
NIC	Nicaragua
PAN	Panama
PAR	Paraguay
PER	Peru
URU	Uruguay
VEN	Venezuela

Middle East

Abbreviations	Country
ALG	Algeria
EGP	Egypt
IRN	Iran
IRQ	Iraq
ISR	Israel
JOR	Jordan
KUW	Kuwait
LEB	Lebanon
LBY	Libya
MOR	Morocco
SAU	Saudi Arabia
SUD	Sudan
SYR	Syria
TUN	Tunisia
YEM	Yemen

Africa

Abbreviations	Country
BUR	Burundi
CAM	Cameroon
CEN	Central African Republic
CHA	Chad
CON	People's Republic of Congo
DAH	Dahomey
ETH	Ethiopia
GAM	Gambia
GHA	Ghana
GUI	Guinea
IVY	Ivory Coast
KEN	Kenya
LBR	Liberia
MLG	Malagasy
MLW	Malawi
MAL	Mali
NIG	Niger
NGA	Nigeria
RHO	Rhodesia
RWA	Rwanda
SEN	Senegal
SIE	Sierra Leone
SOM	Somalia
SAF	South Africa
TAN	Tanzania
UGA	Uganda
UPV	Upper Volta
ZAI	Zaire
ZAM	Zambia